INP-MAY 03

Inland Navigation Planning

Current Practice

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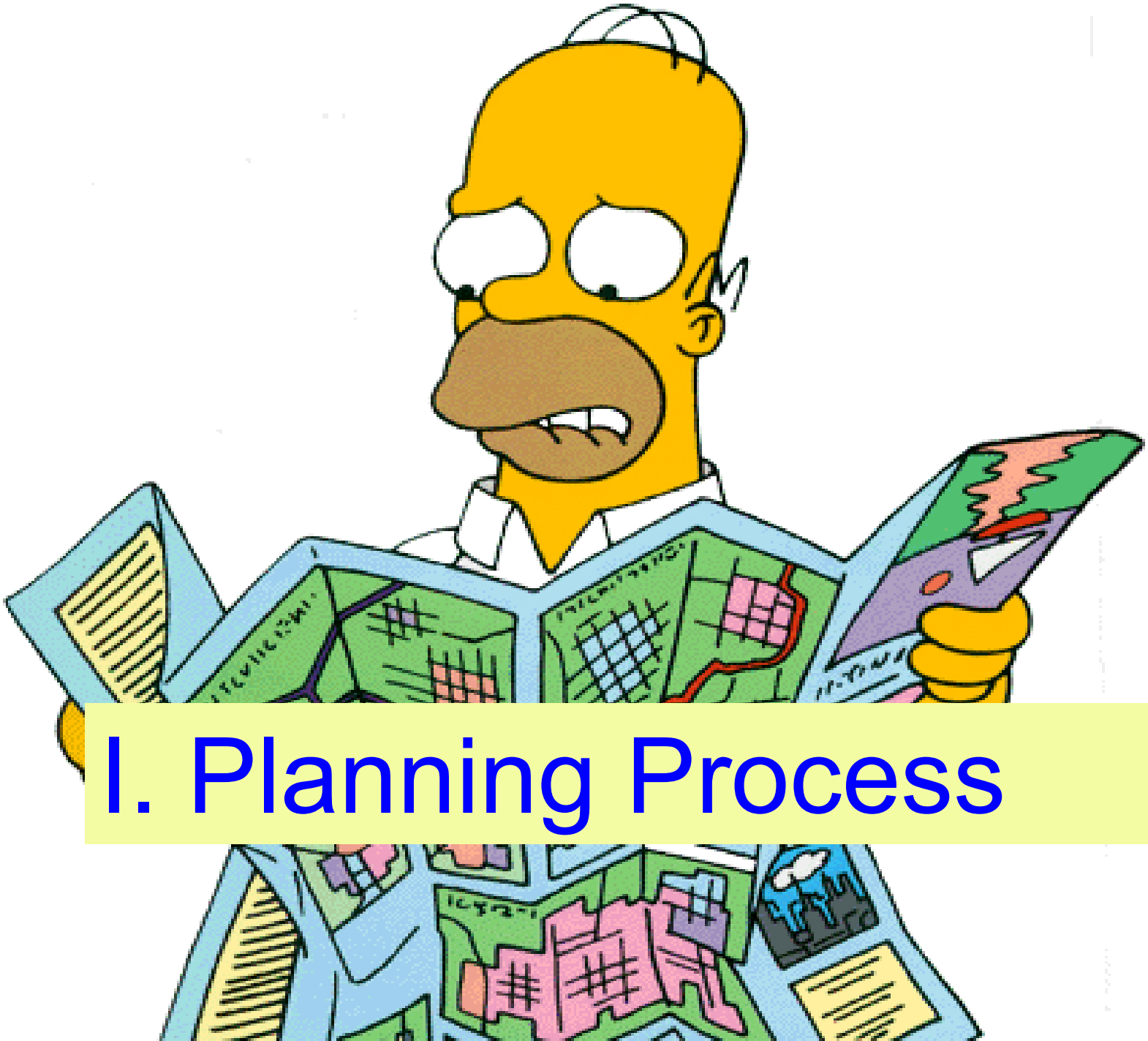
I. Planning Process

II. Evaluation Framework

III. Evaluation Procedures

IV. Practical Issues



I. Planning Process

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“Planning Guidance Notebook”

Ref. ER 1105-2-100, 22 April 2000

http://www.usace.army.mil/inet/functions/cw/cecwp/General_guidance/guidance.htm

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Six Steps

- ✓Identifying Problems and Opportunities
- ✓Inventorying and Forecasting Conditions
- ✓Formulating Alternative Plans
- ✓Evaluating Alternative Plans
- ✓Comparing Alternative Plans
- ✓Selecting a Plan

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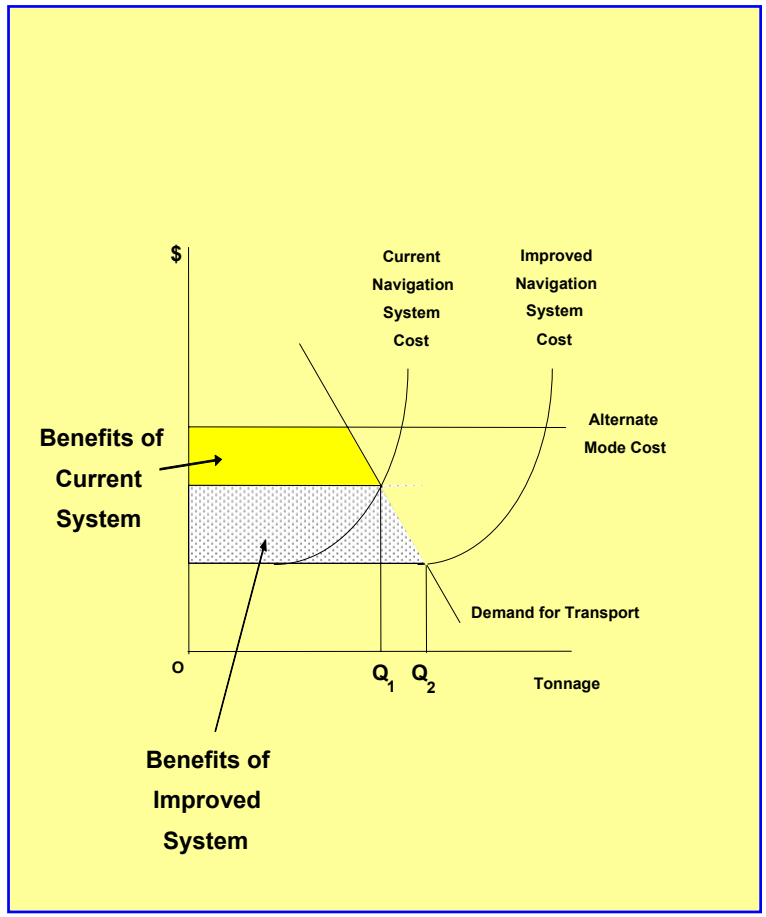
II. Evaluation Framework

- ✓ NED Benefits
- ✓ Without-Project Condition
- ✓ With-Project Condition
- ✓ Evaluation Procedures

Current Practice and Issues

Development of the Without Condition is the Starting Point for Successful Analysis

- Determine structural reliability (condition)
- Optimize non-structural management measures (capacity)
- Estimate traffic movements (demand)
- Evaluate incremental benefits of alternate maintenance scenarios and non-structural measures



III. Evaluation Procedures

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" ….evaluation of navigation projects shall be conducted following the process described in para 2-3e of this regulation."

(ER 1105-2-100)

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" …. The base economic benefit of a navigation project is the reduction in the value of resources required to transport commodities."

(ER 1105-2-100)

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“ ….ten steps are used to estimate benefits associated with improvements of the inland navigation system.”

(ER 1105-2-100)

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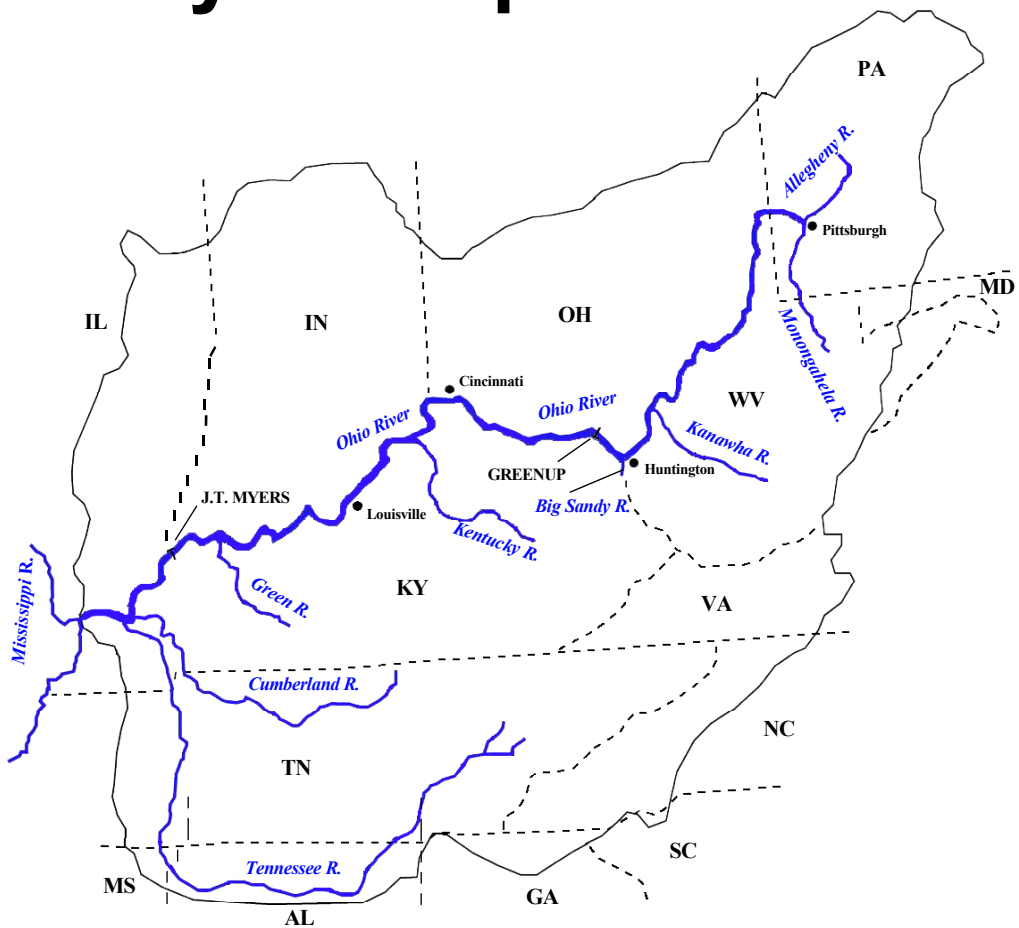
Step 1 – Identify the Commodity Types

(ER 1105-2-100)

LRD Navigation Overview

Major Users of Waterway Transportation

1. High Dependence
   - Coal Mining
   - Electric Generating
   - Coke/Steel Production
   - Petrol-Chemicals
   - Construction
2. Low Dependence
   - Agriculture
   - Wood Products



Ohio River Basin

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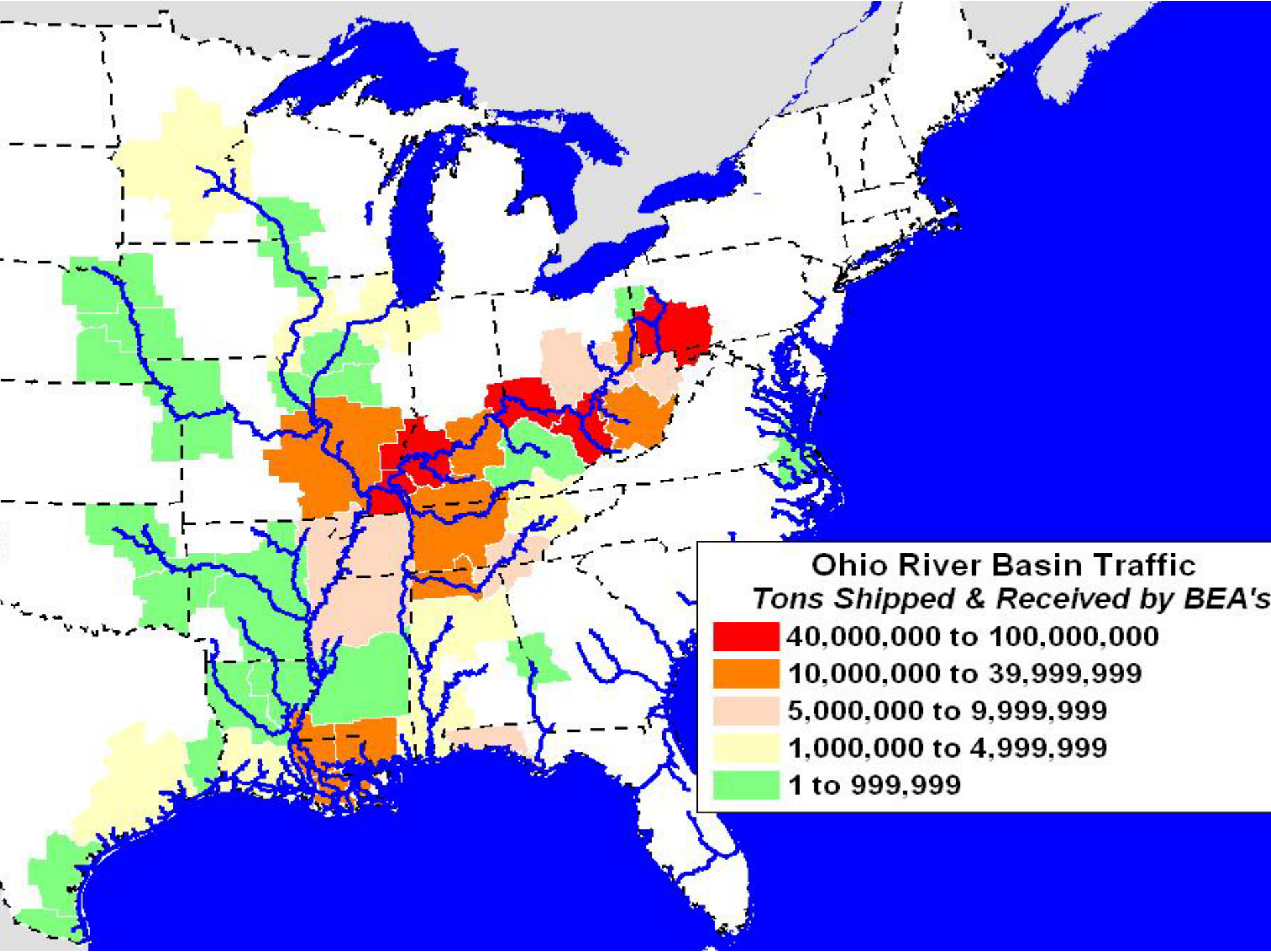
Step 2 – Identify the Study Area

(ER 1105-2-100)


Ohio River Basin Traffic
Tons Shipped & Received by BEA's
40,000,000 to 100,000,000
10,000,000 to 39,999,999
5,000,000 to 9,999,999
1,000,000 to 4,999,999
1 to 999,999

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Step 3 – Determine Current Commodity Flow

(ER 1105-2-100)

2001 Ohio River System	
Commodity	**KTons**
Coal	157,088
Petro. (Crude & Refined)	20,517
Aggregates	46,686
Grains	18,156
Chemicals	10,619
Ores, Minerals	6,912
Iron Ore & Steel	11,026
Other	8,914
Total	279,918

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Step 4 – Determine Current Cost of Waterway Use

(ER 1105-2-100)

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Step 5 – Determine Current Cost of Alternative Movement

(ER 1105-2-100)

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Step 6 – Forecast Potential Waterway Traffic by Commodity

(ER 1105-2-100)

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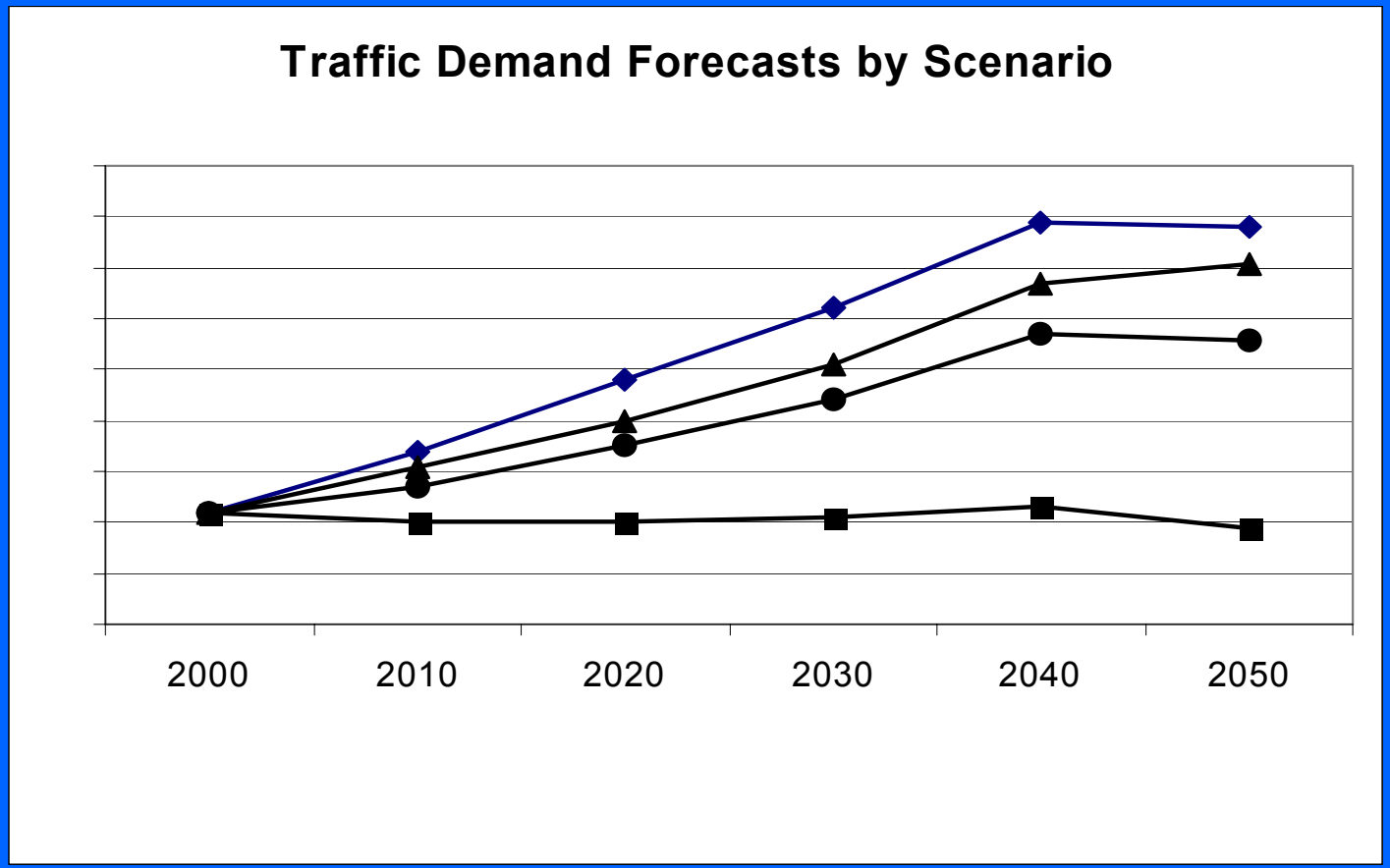
Traffic Scenarios



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Step 7 – Determine Future Cost of Alternative Mode

(ER 1105-2-100)

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Step 8 – Determine Future Cost of Waterway Use

(ER 1105-2-100)

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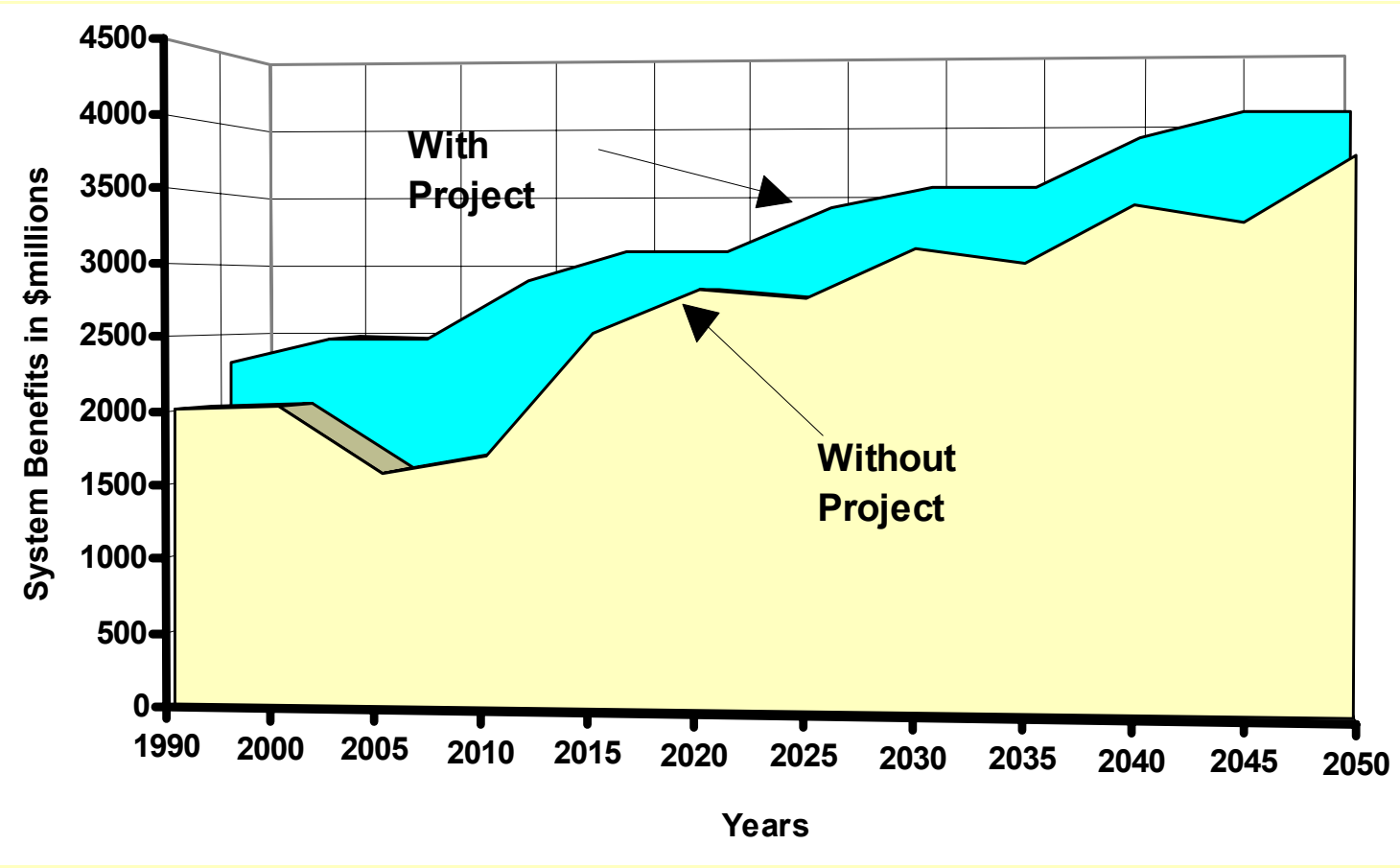
Step 9 – Determine Waterway Use, With and Without-Project

(ER 1105-2-100)

Current Practice and Issues

Incremental Benefit Stream



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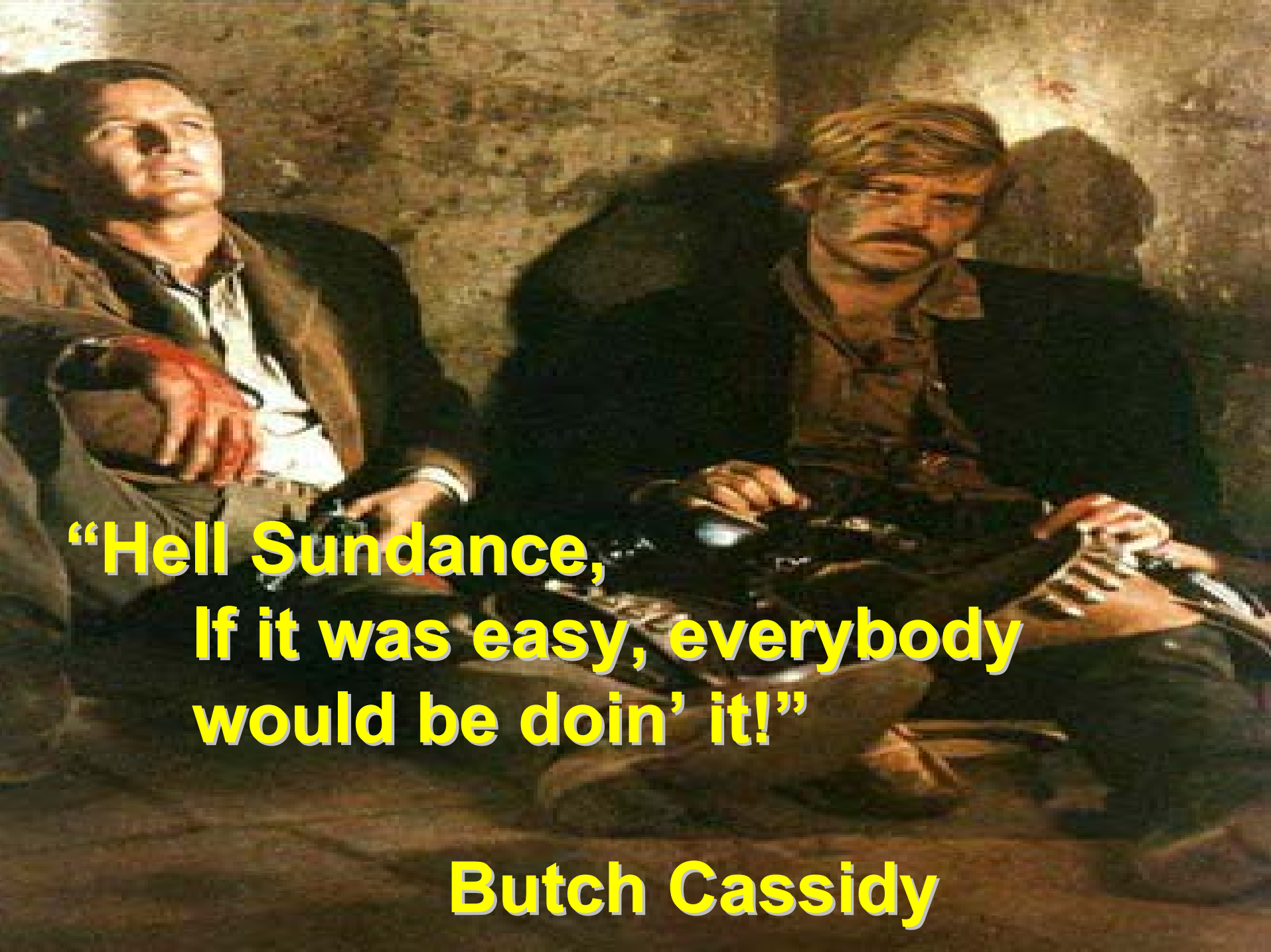
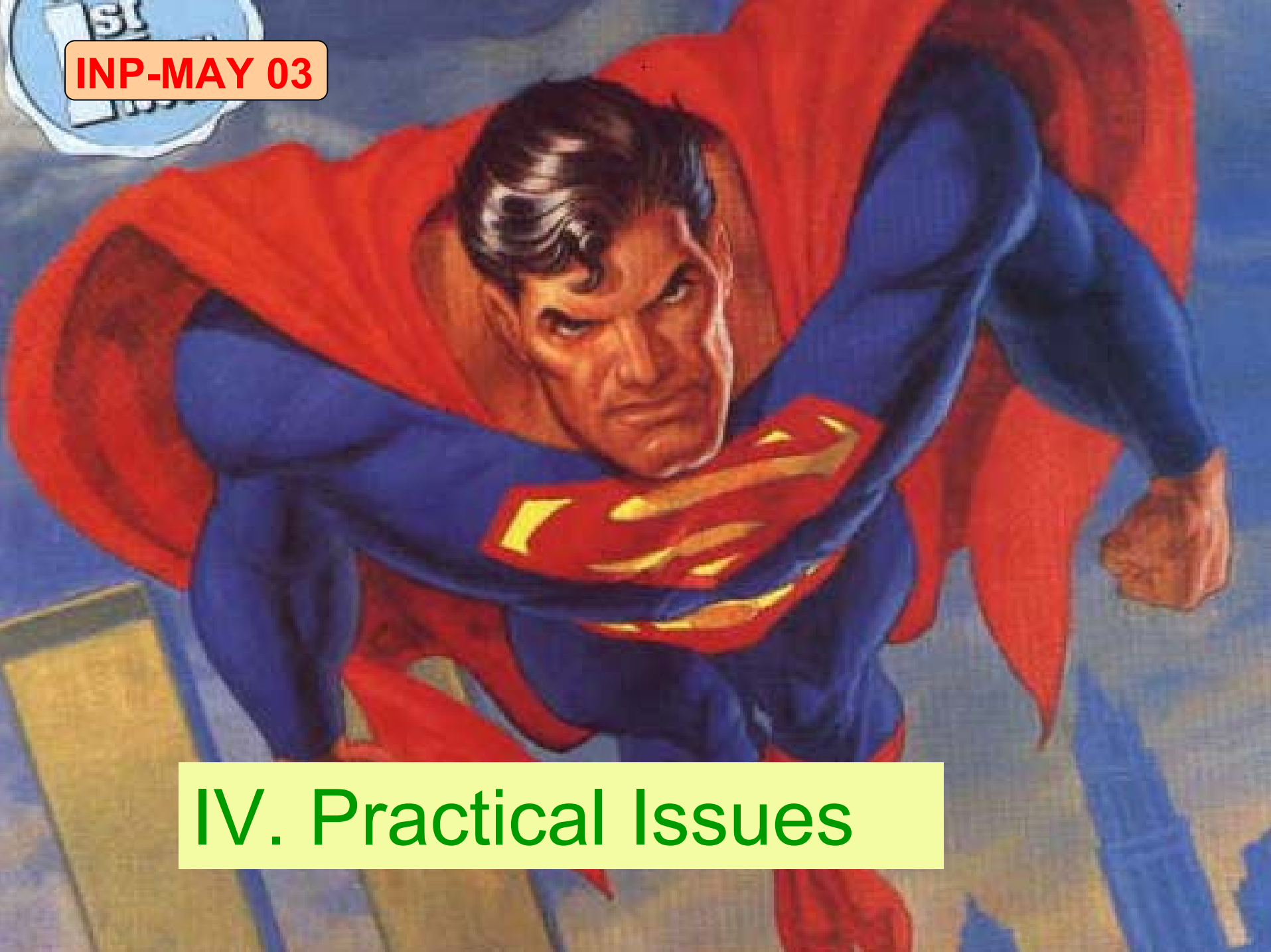
Step 10 – Compute NED Benefits

(ER 1105-2-100)


"Hell Sundance,
If it was easy, everybody
would be doin' it!"
Butch Cassidy



IV. Practical Issues

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Selected Problems

- ✓Shippers & Congestion
- ✓Capacity Management
- ✓Traffic Scenarios
- ✓Externalities
- ✓Disjointed incrementalism

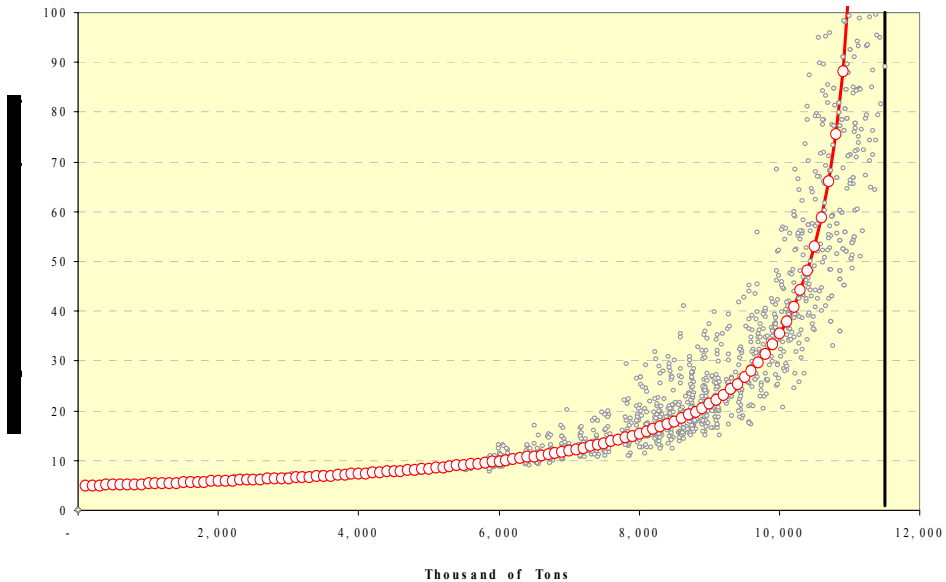
"Nobody goes there anymore, it's too crowded"

Yogi Berra

Current Practice and Issues

Modeling Lock Congestion

- Discrete-event simulation
- WAM requires detailed data input
- Shipment is randomly generated using LPMS distributions
- Based on the tow characteristics & project state, shipment is processed
- Statistics are accumulated and an average delay for the year is calculated



Tonnage-Transit Curve WAM Simulation Results

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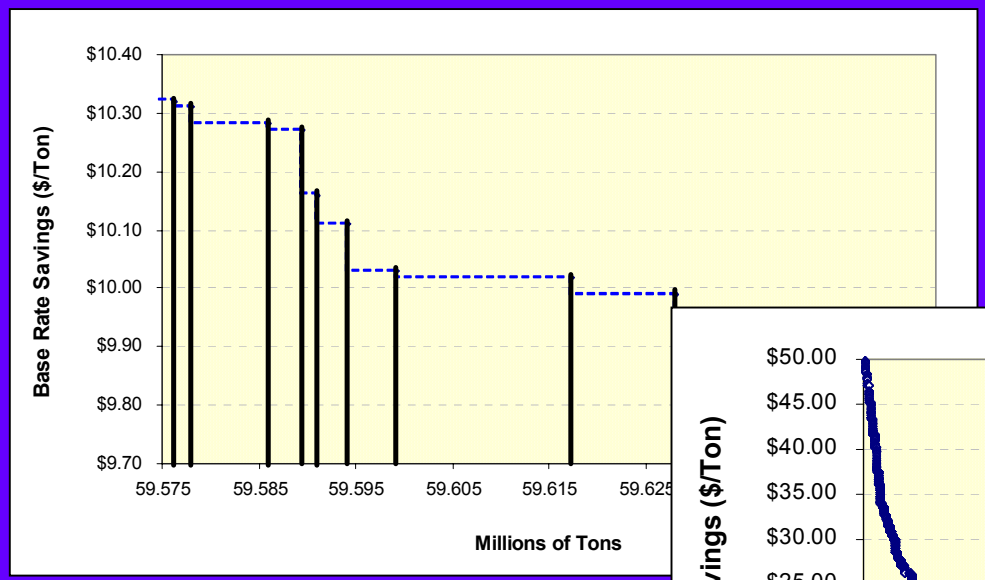
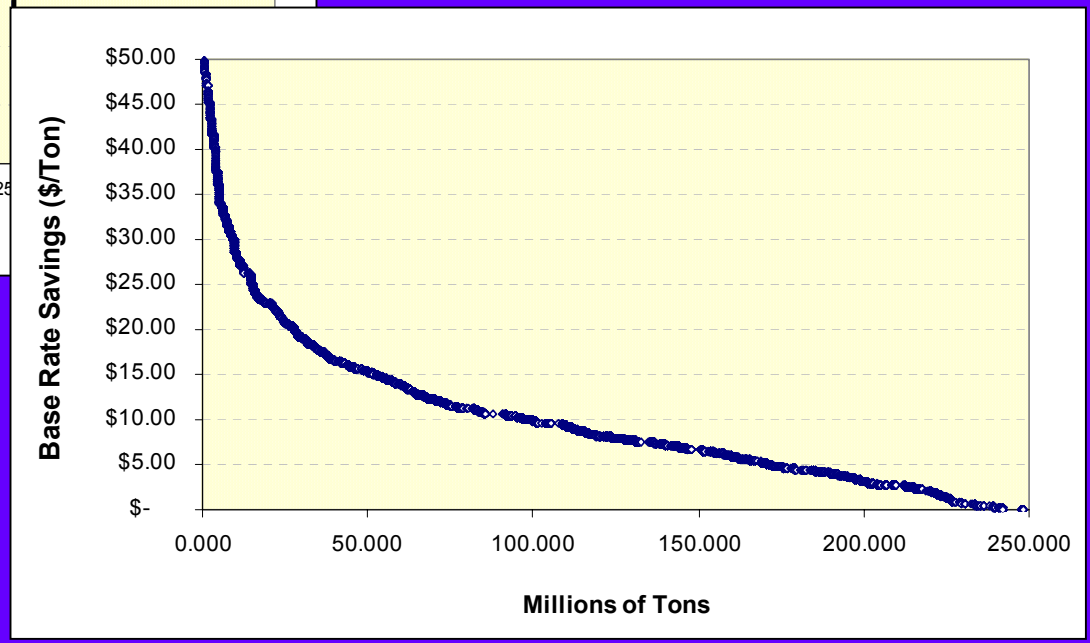
US Army Corps of Engineers

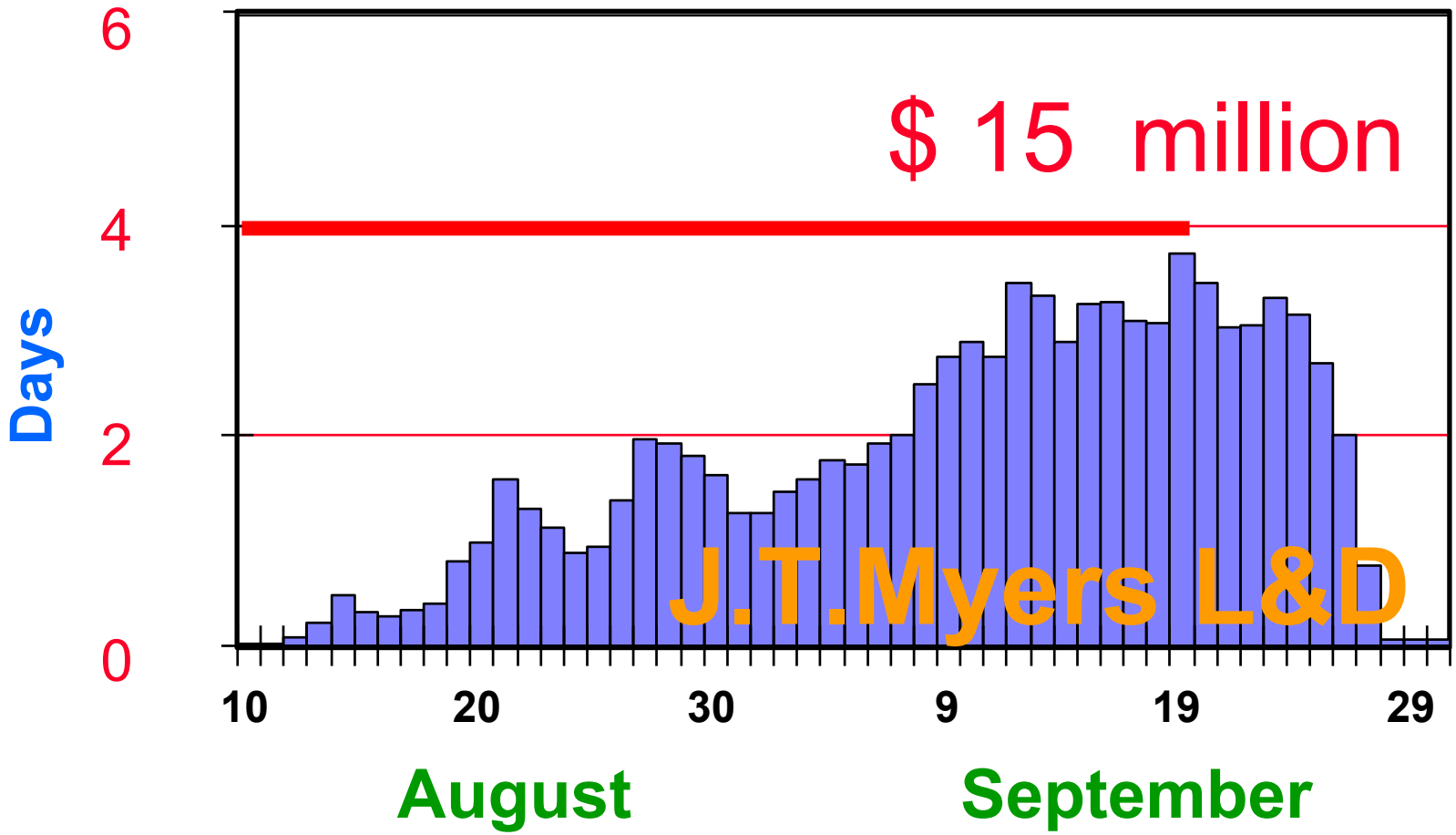
Great Lakes & Ohio River Division

ORS Rate-savings Ranked Movements





Average Daily Delay Per Tow



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Capacity Management

- ✓Small Scale Improvements
- ✓Helper Boats
- ✓Lockage Policies
- ✓Scheduled Lockages
- ✓Congestion Fees

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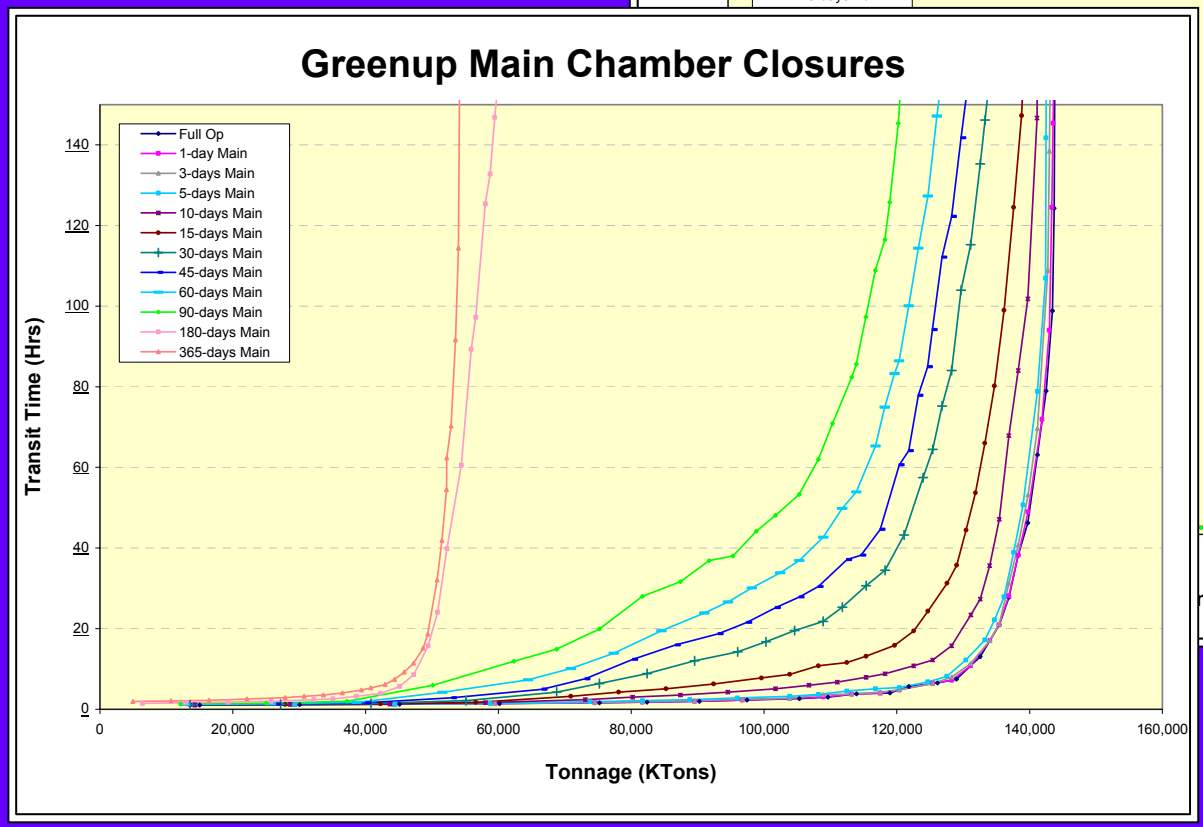
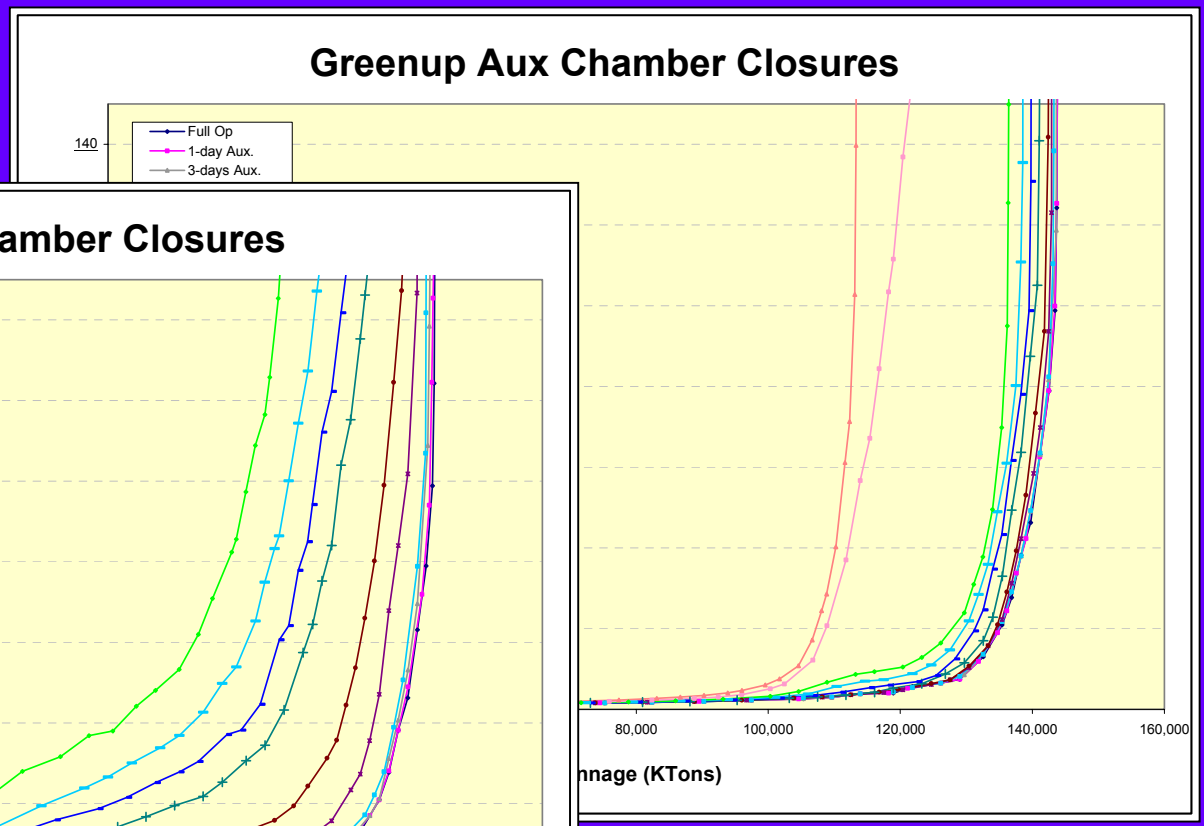
US Army Corps of Engineers

Great Lakes & Ohio River Division

Tonnage-Transit Relationships





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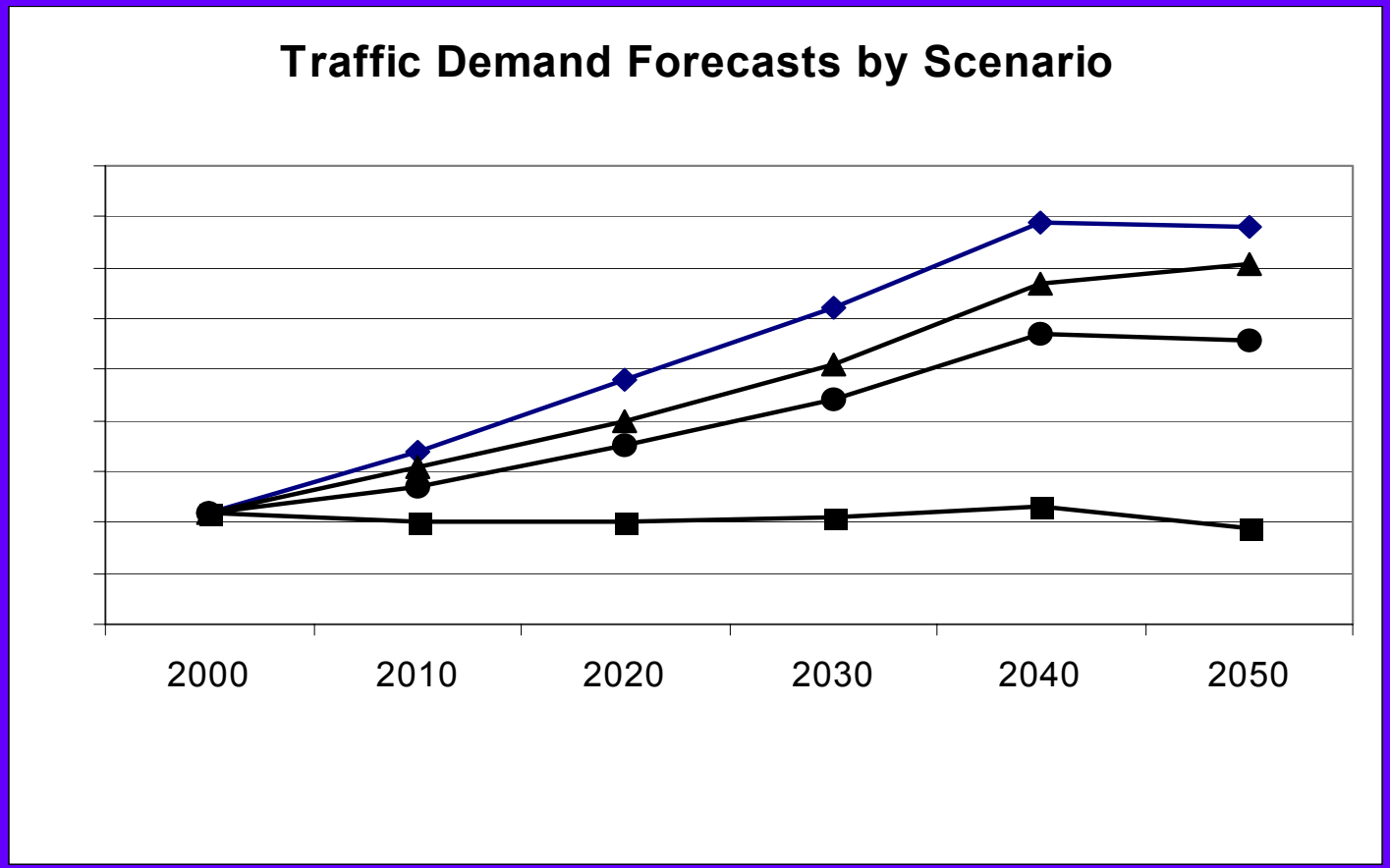

Key Drivers for Coal

- Population → Electricity demand
- Income growth → Electricity demand
- Energy intensity → Electricity demand
- Government utility regulation → Electricity demand and coal use

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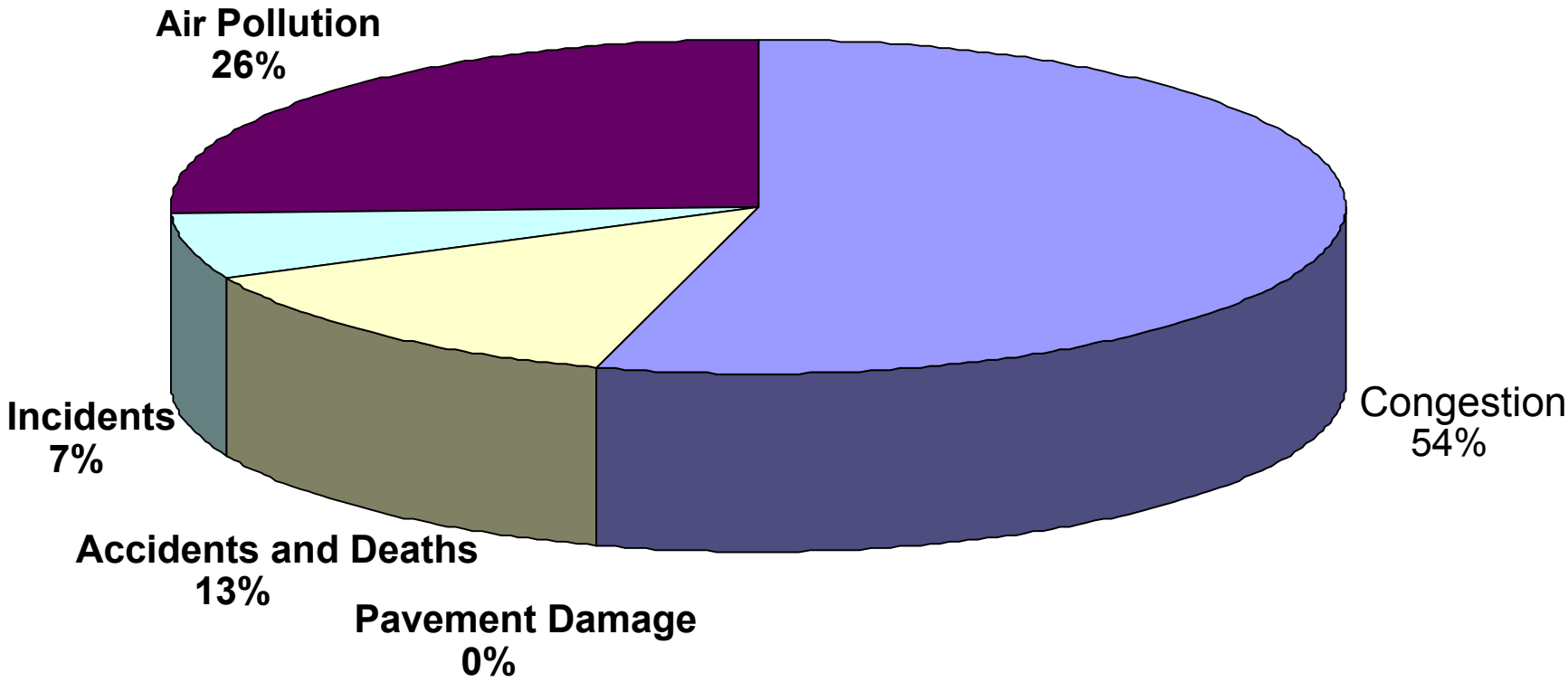
Other Transportation Impacts

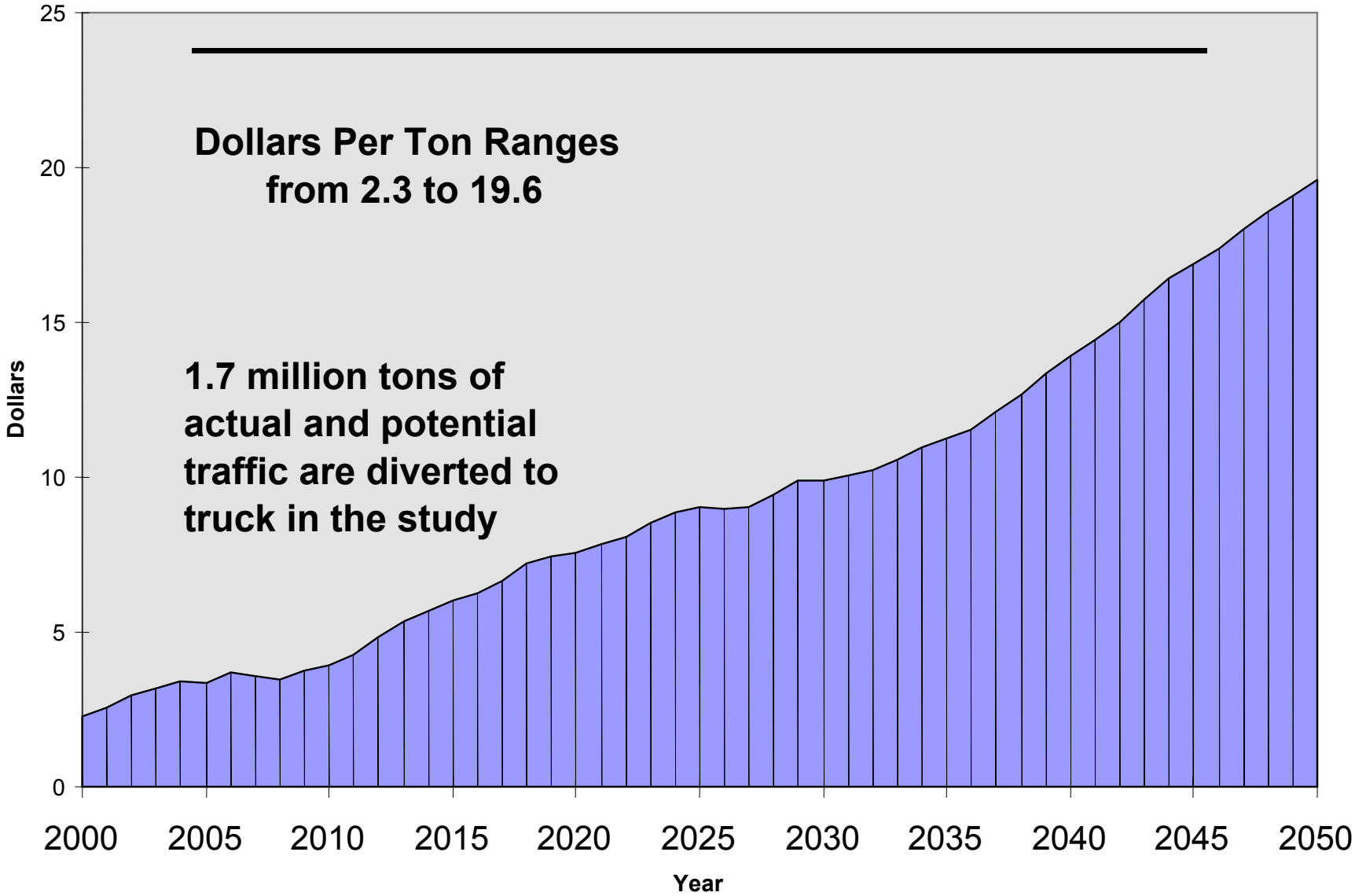
Air Quality

Highway Safety

Externality Costs Associated With An Unscheduled 180 Day Closure of Chickamauga Lock



Externality Costs Per Ton of Diverted Traffic



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"disjointed incrementalism"

"…better data will help the system to be understood. Reiterating what we've known for ages – you can't manage what you can't measure -- better information should lead to better infrastructure utilization."

Stephen Van Beek,
Associate Deputy
Secretary of Transportation

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Recurring Themes

- ✓Uncertainty in the Present
- ✓Uncertainty in the Future
- ✓Comprehensiveness
- ✓External Pressures

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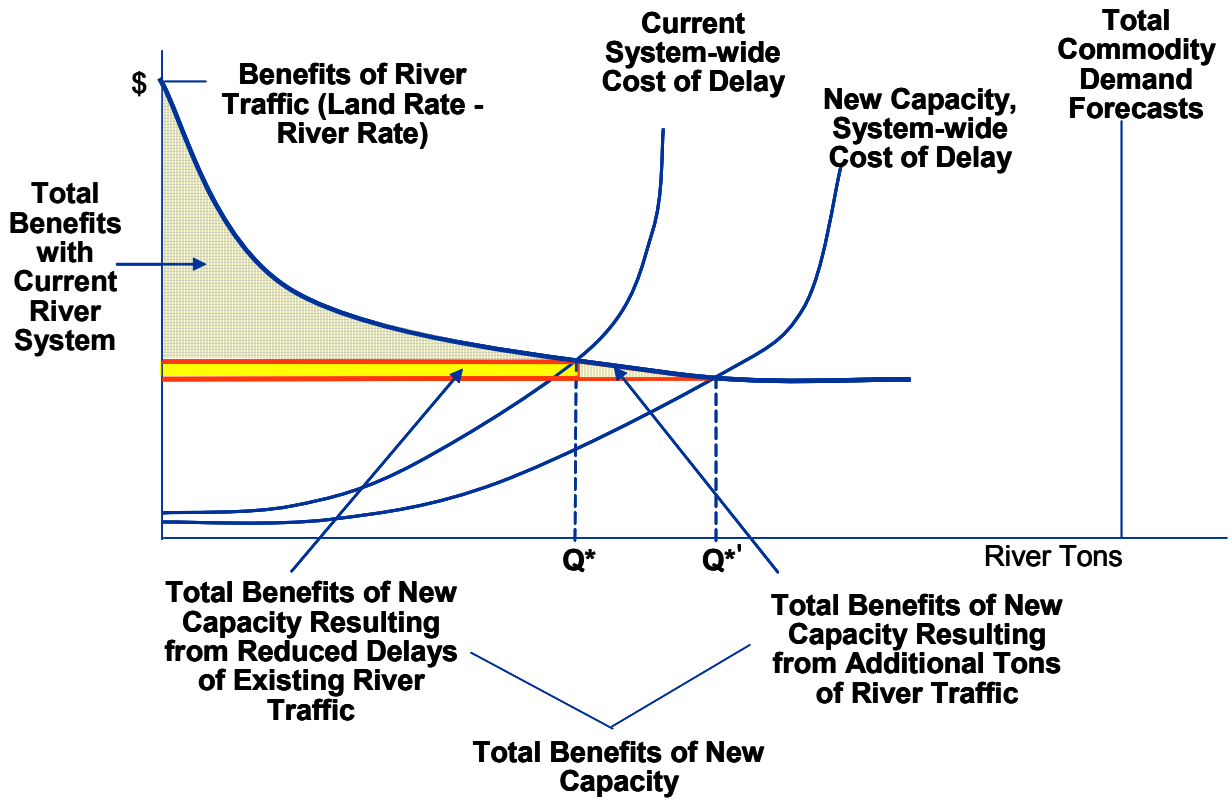
Current Practice and Issues

System Modeling

Are our analytical models appropriate to the task?

- Demand - ARS
- Supply - ATC
- Consumer surplus
- Producer surplus
- Without project
- With project
- Incremental analysis



Current Practice and Issues

Non-Structural Alternatives

Can we better manage the existing system?

- helper boats
- lockage policy
- cut limits
- traffic management
- traffic scheduling
- lockage fees
- small cap improvements